Appendix C. Existing Regulatory Programs for Biosolids Land Application

Summary of Federal, State and Regulatory Requirements

Numerous federal, state, and local agencies currently regulate biosolids land application. Agency jurisdiction may vary depending on the beneficial use/disposal methods employed and location. In general, the United States Environmental Protection Agency (EPA) provides federal regulations that are implemented by state and local governments. In California, many state and local agencies have developed additional rules, guidelines, and criteria for biosolids regulation.

Table 1 Federal Regulations Governing Biosolids

Federal Regulation		Land Application	Distribution and Marketing	Monofills and Surface Disposal	Codisposal Landfill and Landfill Cover
40 CFR 122-124	Requires biosolids disposal to be included in NPDES	X	X	X	X
40 CFR 257	Regulates use and disposal of biosolids not regulated by 40 CFR 503	X	X	X	X
40 CFR 261-268, 271, and 301	Defines whether biosolids are hazardous	X	X	X	X
40 CFR 501	Requires states to implement federal regulations for biosolids	X	X	X	X
40 CFR 503	Regulates land application, surface disposal, and incineration	X	X	X	X
40 CFR 761	Defines biosolids containing more than 50 mg/kg of PCBs as toxic	X	X	X	X

Federal Requirements

The EPA is the primary federal agency having jurisdiction over biosolids management. It is the responsibility of each state to develop programs to implement the rules and guidelines established by EPA. In general, state compliance with EPA guidelines is verified by EPA's regional offices.

Congress has been aware of biosolids use and disposal problems since passing the Clean Water Act (CWA) in 1972. However, regulations governing biosolids management practices did not appear until 1977, when amendments to the CWA led to the promulgation of 40 CFR Part 257 (under the joint authority of the CWA and the Resource Conservation and Recovery Act [RCRA]). Passage of Part 257 established standards for cadmium, PCBs, and pathogens in biosolids applied to land and established general management standards for solid waste landfills. In addition to the CWA, several other federal laws provide authority to regulating various aspects of

biosolids disposal. These include the Clean Air Act; Subtitles C and D of RCRA; the Marine Protection, Research, and Sanctuaries Act (MPRSA); the Toxic Substances Control Act; and the recently promulgated 40 CFR Part 503 Standards for the Use and Disposal of Sewage Sludge. Table 5.1 lists current federal regulations that directly apply to the land application of biosolids.

Recent Federal Activity

In 1987, Congress called upon the EPA to comprehensively regulate the use and disposal of biosolids with the passage of the Water Quality Act of 1987 (P.L. 100-4)(WQA). This act required the promulgation of technical standards and placed new emphasis on identifying and limiting those toxic pollutants in biosolids that may adversely affect public health or the environment. Congress further required that EPA implement the technical standard through NPDES permits issued to POTWs unless current permit conditions issued under other federal programs or state programs ensured compliance with Section 405.

In order to implement the long-term biosolids permitting program required by the WQA, EPA has initiated two rulemakings. The first rulemaking includes 40 CFR Parts 122, 123, and 124 and 40 CFR Part 501. Parts 122, 123, and 124 set requirements and procedures for including biosolids conditions in NPDES permits. Part 501 sets requirements and procedures for approving state biosolids management programs to operate in lieu of federal programs, or for federal programs to implement biosolids permits if a state so chooses. The second rulemaking, 40 CFR Part 503 (503), adopted February 19, 1993 sets the technical standards for biosolids use and disposal.

As stated previously, biosolids land application is regulated at the federal level by the EPA through the 40 CFR Part 503 (503) regulations. These regulations establish standards for pollutant limits, operational standards, management practices, and monitoring, recordkeeping, and reporting requirements. The regulation is self-implementing and imposes requirements on persons who prepare sewage biosolids or material derived from sewage biosolids and land appliers of sewage biosolids. Compliance with the 40 CFR Part 503 standards became effective February 19, 1994. To land apply biosolids, the biosolids must satisfy the requirements for pollutant limitations, pathogen reduction, and vector attraction reduction as described in the following sections.

Pollutants Limits

Tables 2 and 3 present standards for the metals regulated by 503 for land application of biosolids. The 503 pollutant concentrations and ceiling concentrations are presented in Table 5.2. Biosolids with pollutant levels greater than the 503.13 Table 1 ceiling concentrations cannot be applied to land. Biosolids with pollutant levels below the 503.13 Table 1 ceiling concentrations, but above pollutant concentrations in 503.13 Table 3 can be applied to land, but are subject to the annual and cumulative pollutant loadings shown in Table 3. Biosolids with pollutant levels below 503.13 Table 3 limits can be applied to land without regard to annual or cumulative loading restrictions.

Pathogen Reduction

In addition to pollutant concentrations, biosolids must not pose a public health risk. 40 CFR Part 503, therefore, stipulates that biosolids applied to land must also be treated for pathogen and vector attraction reduction. 503 gives both performance-based standards and technology based standards for methods to reduce pathogens.

The 40 CFR Part 503 identifies two levels of pathogen reduction requirements, Class A and Class B, which may be satisfied by certain treatment methods and/or by meeting pathogen limitation standards. The goal of Class A requirements is to reduce pathogens to below

detectable limits. The goal of Class B biosolids is to meet adequate pathogen reduction requirements and to rely upon

Table 2 CFR Part 503 Land Application - Pollutant Concentration Limits		
Pollutant	**503.13 Table 1 Ceiling Concentrations (mg/kg)(1)**	**503.13 Table 3 Pollutant Concentrations (mg/kg)(1)**
Arsenic	75	41
Cadmium	85	39
Copper	4,300	1,500
Lead	840	300
Mercury	57	17
Molybdenum	75	NA(2)
Nickel	420	420
Selenium	100	100
Zinc	7,500	2,800

Notes:
(1) Dry weight basis.
(2) Temporarily suspended by EPA pending further consideration. Value was 18 mg/kg.

environmental factors at the beneficial site to further reduce pathogens. Therefore, sites which use Class B biosolids must follow additional site restrictions concerning public access, animal grazing, and crop harvesting.
The 40 CFR Part 503 provides various alternatives for meeting Class A and Class B pathogen requirements. Class A biosolids must meet the following two criteria:

1. One of the Class A pathogen reduction alternatives listed on Table 4 must be met before or at the same time as vector attraction, except when vector attraction reduction is met by Options 6, 7, or 8 (see Table 5.12), and

Table 3 40 CFR Part 503 Annual and Cumulative Land Application Rates		
Pollutant	**503.13 Table 2 Cumulative Pollutant Loading Rate (kg/hectare)**	**503.13 Table 4 Annual Pollutant Loading Rate (kg/hectare/year)**
Arsenic	41	2.0
Cadmium	39	1.9
Copper	1,500	75
Lead	300	15
Mercury	17	0.85
Molybdenum	NA(1)	NA(2)
Nickel	420	21
Selenium	100	5.0
Zinc	2,800	140

Notes:
(1) Temporarily suspended by EPA pending further review. Value was 18 kg/hectare.
(2) Temporarily suspended by EPA pending further review. Value was 0.90 kg/hectare/yr.

Table 4 40 CFR Part 503 Class A Pathogen Reduction Alternatives

Alternative	Description
A1: Thermally Treated Biosolids	Maintain biosolids at certain elevated temperature for prescribed period of time (see 503 Regulations for details).
A2: Biosolids Treated in a High pH-High Temperature Process	Maintain biosolids at certain elevated temperature and pH for prescribed period of time (see 503 Regulations for details).
A3: Biosolids Treated in Other Process	• The density of enteric viruses in the biosolids after pathogen treatment must be less than 1 PFU per 4 grams of total solids. • The density of viable helminth ova in the biosolids after pathogen treatment must be less than 1 per 4 grams of total solids. • Report operating parameters to indicate consistent pathogen reduction treatment.
A4: Biosolids Treated in Unknown Processes	• The density of enteric viruses in the biosolids after pathogen treatment must be less than 1 PFU per 4 grams of total solids. • The density of viable helminth ova in the biosolids after pathogen treatment must be less than 1 per 4 grams of total solids.
A5: Processes to Further Reduce Pathogens (PFRP)	
Composting	Using either the within-vessel composting method or the static aerated pile composting method, the temperature of the biosolids is maintained at 55 degrees Celsius or higher for three days. Using the windrow composting method, the temperature of the biosolids is maintained at 55 degrees or higher for 15 days or longer. During the period when the compost is maintained at 55 degrees or higher, there shall be a minimum of five turnings of the windrow.
Heat Drying	Biosolids is dried by direct or indirect contact with hot gases to reduce the moisture content of the biosolids to 10 percent or lower. Either the temperature of the biosolids particles exceeds 80 degrees Celsius or the wet bulk temperature of the gas in contact with the biosolids as the biosolids leaves the dryer exceed 80 degrees Celsius.
Heat Treatment	Liquid biosolids is heated to a temperature of 180 degrees Celsius or higher for 30 minutes.
Thermophilic Aerobic Digestion	Liquid biosolids is agitated with air or oxygen to maintain aerobic conditions and the mean cell residence time of the biosolids is 10 days at 55 to 60 degrees Celsius.
Beta Ray Irradiation	Biosolids is irradiated with beta rays from an accelerator at dosages of at least 1.0 megarad at room temperature (ca. 20 degrees Celsius).
Gamma Ray Irradiation	Biosolids is irradiated with gamma rays from certain isotopes, such as Cobalt 60 and Cesium 137, at room temperature (ca. 20 degrees Celsius).
Pasteurization	The temperature of the biosolids is maintained at 70 degrees Celsius or higher for 30 minutes or longer.
A6: Use of Processes Equivalent to PFRP	Demonstrate operating parameters and/or pathogen levels to be PFRP equivalent subject to permitting authority approval.

2. Class A biosolids must be monitored for bacteria regrowth at the time of usage or disposal. Fecal coliform density must be less than 1,000 Most Probable Number (MPN) per gram of total dry solids (1,000 MPN/g TS) or Salmonella sp. density less than 3 MPN per 4 grams of total dry solids (3 MPN/4g TS).

Biosolids that are to be land applied must, at a minimum, meet Class B pathogen reduction re quirements and provide for site restrictions. Alternatives for Class B are shown on Table 5.

Table 5 40 CFR Part 503 Class B Pathogen Reduction Alternatives

Alternative		Description
B1:	Monitoring of Fecal Coliform	The geometric mean of seven samples of treated biosolids, collected at time of use or disposal shall meet a fecal coliform density of less than 2 million colony forming units or most probable number per gram of biosolids solids (dry weight basis).
B2:	Processes to Significantly Reduce Pathogens (PSRP)	
	Aerobic Digestion	Biosolids is agitated with air or oxygen to maintain aerobic conditions for a specific mean cell residence time at a specific temperature. Values for the mean cell residence time and temperature shall be between 40 days at 20 degrees Celsius and 60 days at 15 degrees Celsius.
	Air Drying	Biosolids is dried on sand beds or on paved or unpaved basins. The biosolids dries for a minimum of three months. During two of the three months, the ambient average daily temperature is above zero degrees Celsius.
	Anaerobic Digestion	Biosolids is treated in the absence of air for a specific mean cell residence time at a specific temperature. Values for the mean cell residence time and temperature shall be between 15 days at 35 to 55 degrees Celsius and 60 days at 20 degrees Celsius.
	Composting	Using either the within-vessel, static aerated pile, or windrow composting methods, the temperature of the biosolids is raised to 40 degrees Celsius or higher and remains at 40 degrees Celsius or higher for five days. For four hours during the five days, the temperature in the compost pile exceeds 55 degrees Celsius.
	Lime Stabilization	Sufficient lime is added to the biosolids to raise the pH of the biosolids to 12 after two hours of contact.
B3:	Use of Processes Equivalent to PSRP	Demonstrate operating parameters and/or pathogen levels to be PSRP equivalent subject to permitting authority approval.

Site Restrictions

Biosolids meeting Class B pathogen reduction requirements must also comply with the following site restrictions.

1. Food crops with harvested parts that touch the biosolids/soil mixture (such as melons, cucumbers, squash, etc.) shall not be harvested for 14 months after application of biosolids.
2. Food crops with harvested parts below the soil surface (root crops such as potatoes, carrots, radishes) shall not be harvested for 20 months after application of biosolids if the biosolids had been stored on land surface for at least 4 months prior to incorporation into the soil.
3. Food crops with harvested parts below the soil surface (root crops such as potatoes, carrots, radishes) shall not be harvested for 38 months after application if the biosolids had been stored on land surface for less than 4 months prior to incorporation into the soil.
4. Food crops, feed crops, and fiber crops shall not be harvested for 30 days after biosolids application.
5. Animals shall not graze on a site for 30 days after biosolids application.
6. Turf shall not be harvested for one year after biosolids application if the turf is placed on land with a high potential for public exposure or a lawn, unless otherwise specified by the permitting authority.
7. Public access to land with high potential for public exposure shall be restricted for 1 year after biosolids application.
8. Public access to land with a low potential for public exposure shall be restricted for 30 days after biosolids application.

Vector Attraction Reduction

Vector attraction is any characteristic which attracts disease vectors. Disease vectors are insects or animals which are capable of transporting and transmitting infectious agents. Some common vectors include flies, mosquitos, and rodents. Their interaction with humans provides a pathway for transmission of disease. Vectors themselves are not pathogenic. The 40 CFR Part 503 specifies ten alternatives for meeting the vector attraction reduction requirement as shown on Table 6.

Exceptional Quality Biosolids

Biosolids that meet the High Quality Pollutant Concentrations listed in Table 5.8, one of the Class A pathogen reduction requirements, and one of the vector attraction reduction alternatives (Options 1 through 8) may be identified as "exceptional quality biosolids." Exceptional quality biosolids may be used and distributed in bulk or bag form and are not subject to general requirements and management practices other than monitoring, recordkeeping, and reporting to substantiate that the quality criteria have been met.

Table 6 40 CFR Part 503 Vector Attraction Reduction Requirements

Option	Process
(1)	The mass of volatile solids in the biosolids shall be reduced by a minimum of 38 percent during biosolids treatment.

Table 6 40 CFR Part 503 Vector Attraction Reduction Requirements	
Option	**Process**
(2)	When the 38 percent volatile solids reduction requirement cannot be met for an anaerobically digested biosolids, vector attraction reduction can be demonstrated by digesting a portion of the previously digested biosolids anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30 and 37 degrees Celsius. When, at the end of the 40 days, the volatile solids in the biosolids at the beginning of that period is reduced by less than 17 percent, vector attraction reduction is achieved.
(3)	When the 38 percent volatile solids reduction requirement in cannot be met for an anaerobically digested biosolids, vector attraction reduction can be demonstrated by digesting a portion of the previously digested biosolids that has a percent solids of two percent or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20 degrees Celsius. When, at the end of the 30 days, the volatile solids in the biosolids at the beginning of that period is reduced by less than 15 percent, vector attraction reduction is achieved.
(4)	The specific oxygen uptake rate (SOUR) for biosolids treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20 degrees Celsius.
(5)	Biosolids shall be treated in an aerobic process for 14 days or longer. During that time, the temperature of the biosolids shall be higher than 40 degrees Celsius and the average temperature of the biosolids shall be higher than 45 degrees Celsius.
(6)	The pH of biosolids shall be raised to 12 or higher by alkali addition and, without the addition of more alkali, shall remain at 12 or higher for two hours and then at 11.5 or higher for an additional 22 hours at 25 degrees Celsius.
(7)	The percent solids of biosolids that does not contain unstabilized solids shall be equal to or greater than 75 percent based on the moisture content and total solids prior to mixing with other materials.
(8)	The percent solids of biosolids that contains unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90 percent based on the moisture content and total solids prior to mixing with other materials.
(9)	Biosolids shall be injected below the surface of the land. No significant amount of the biosolids shall be present on the land surface within one hour after the biosolids is injected. When the biosolids that is injected below the surface of the land is Class A with respect to pathogens, the biosolids shall be injected below the land surface within eight hours after being discharged from the pathogen reduction process.
(10)	Biosolids applied to the land surface or placed on a surface disposal site shall be incorporated into the soil within six hours after application to or placement on the land. When biosolids that is incorporated into the soil is Class A with respect to pathogens, the biosolids shall be applied to or placed on the land within eight hours after being discharged from the pathogen treatment process.
(11)	Biosolids placed on a surface disposal site shall be covered with soil or other material at the end of each operating day.
(12)	The pH of domestic septage shall be raised to 12 or higher by alkali addition and, without the addition of more alkali, shall remain at 12 or higher for 30 minutes at 25 degrees Celsius.

Management Practices

The following are a few general management practice guidelines for the land application of biosolids.

1. Bulk biosolids shall not be applied to the land if it is likely to adversely affect a threatened or endangered species listed under Section 4 of the Endangered Species Act or its designated critical habitat.

2. Bulk biosolids shall not be applied to agricultural land, forest, a public contact site, or a reclamation site that is flooded, frozen, or snow-covered so that the bulk biosolids enters a wetland or other waters of the United States, as defined in 40 CFR Part 122.2, except as provided in a permit issues pursuant to Section 402 or 404 of the Clean Water Act.

3. Bulk biosolids shall not be applied to agricultural land, forest, or a reclamation site that is 10 meters (33 feet) or less from waters of the United States, as defined in 40 CFR 122.2, unless otherwise specified by the permitting authority.

Distribution and Marketing of Biosolids Products

The distribution and marketing of biosolids-derived fertilizers and soil conditioners are regulated under 40 CFR Part 503. Biosolids applied to farmland, forest, and reclamation sites must at a minimum meet the pollutant Ceiling Concentration Limits from Table 2, Class B pathogen requirements, and vector attraction reduction requirements. The biosolids can be applied using the Cumulative Pollutant Loading Rates under Table 3 if the biosolids do not meet the pollutant Ceiling Concentrations. Biosolids that are applied on lawns and home gardens must meet Class A pathogen requirements, a vector attraction reduction requirement, and the High Quality Pollutant Concentration listed in Table 2. The exception is that biosolids which meet the pollutant Ceiling Concentration, but not the High Quality Pollutant Concentration can be sold for use at product application rates prescribed on a label that are based on meeting Annual Pollutant Loading Rates.

Overall, a label shall be affixed to the bag or other container in which biosolids are sold or given away for application to land, or an information sheet shall be provided to the person who receives biosolids sold or given away in a container for application to the land. The label or information sheet shall contain the following information:

1. The name and address of the person who prepared the biosolids that is sold or given away in a bag or other container for application to the land;

2. A statement that application of the biosolids to the land is prohibited except in accordance with the instructions on the label or information sheet; and

3. The annual whole sludge application rate for the biosolids that does not cause any of the annual pollutant loading rates in Table 3 to be exceeded.

Monitoring Frequency

Monitoring frequency for pollutants, pathogen densities, and vector attraction reductions is based on the amount of biosolids used or disposed as shown on Table 7. More frequent monitoring is encourage to check quality abnormalities. Alternatives which use operating parameters to satisfy pathogen and vector attraction reduction requirements should monitor operations continuously.

Table 7 40 CFR Part 503 Monitoring Frequency

Amount of Biosolids Used or Disposed (metric tons per 365 day period - dry weight)[1]	Monitoring Frequency per Year
0 > amount > 290	Once
290 ≥ amount > 1,500	Quarterly (4 times)
1,500 ≥ amount > 15,000	Bimonthly (6 times)
amount ≥ 15,000	Monthly (12 times)

(1) 1 metric ton = 1.1 English tons.

Recordkeeping

Generally, the preparer(s) of the biosolids is required to maintain records of the biosolids to meet pollutants, pathogens, and vector attraction reduction requirements. The applier(s) are required to maintain records of application rates, management practices, and site restrictions. Records must be kept for five years.

Reporting

Annual reports are due to the permitting authority February 19 every year from all POTWs with a design flow of 1 million gallons per day (mgd) or greater or which service a population of 10,000 people or greater.

These 503 standards, which are known as the Round 1 regulations, set limits for nine heavy metals in biosolids that are land applied. Meanwhile, the EPA continued to evaluate 31 candidate pollutants for Round 2 of the regulation. Based on the results of risk assessment screening, EPA concluded that 2 of the 31 pollutants warrant further consideration for regulations:

1. Dioxins/dibenzofurans.
2. Polychorinated biphenyls (co-planes) (PCB).

Currently, the EPA has not established any preliminary range of concentration limits for these constituents. Per discussions with Lauren Fondahl of EPA Region IX, possible limits may be derived from other current regulations. The dioxin limitation may reference the pulp and paper mill discharge limitation which ranges from an average concentration of 10 parts per trillion (ppt) to a maximum of 50 ppt. The PCB concentration limit may derive from 40 CFR Part 761 which states that biosolids exceeding 50 parts per million is considered a hazardous waste.

However, EPA can still add or delete other pollutants when the Round 2 regulation is proposed. The Round 2 regulation must be proposed by December 1999 and promulgated by December 2001.

The EPA also published revisions to 40 CFR Part 261 on March 29, 1990, defining the new toxicity characteristic leaching procedure (TCLP) to be used as of September 25, 1990, in determining whether a waste is "hazardous." The revised rule also adds 25 new organic constituents to the list of toxic constituents of concern. Other changes are also made in calculations or regulatory levels of organic chemicals. The new TCLP replaces the Extraction Procedure (EP) leach test that was previously used by EPA in defining toxicity.

State Requirements

On the State level, biosolids beneficial use/disposal is regulated by the following agencies under Cal/EPA: State Water Resources Control Board (SWRCB), Office of Environmental Health Hazard Assessment (OEHHA), Department of Toxic Substances Control (DTSC), California Integrated Waste Management Board (CIWMB), and California Air Resources Board (CARB). In general, the SWRCB, through its nine regional boards, is primarily concerned with protecting present and probable future beneficial uses of water, as required by the Porter-Cologne Water Quality Control Act (contained in Division 7 of the California Water Code).

The discharge of wastes to land in California is also regulated by the SWRCB according to the California Code of Regulations (CCR), Title 23 Waters, Chapter 15, Article 2. Chapter 15 regulations apply to the disposal of biosolids on dedicated land. Other regulations include Title 22, Chapter 11; Department of Health Services Manual of Good Practice; the California Environmental Quality Act, etc. Table 8 lists current California regulations that directly apply to biosolids use and disposal methods.

Table 8	California Regulations Governing Biosolids				
	Federal Regulation	Land Appli-cation	Distributio n and Marketing	Monofills and Surface Disposal	Codisposal Landfill and Landfill Cover
CCR Title 23 §2908	Regulates discharge of municipal solid waste to land including biosolids.	X	X	X	X
CCR Title 23 §2510 et. seq.	Regulates discharge of waste to land including biosolids.	X	X	X	X
CCR Title 23 §3680 et. seq.	Regulates operator certification for wastewater treatment operators.			X	
CCR Title 22 §66261.24	Defines whether biosolids are hazardous.	X	X	X	X
PRC §40191	Includes biosolids in the definition of solid waste.	X	X	X	X
PRC §42246	Requires procuring agencies to document use of fertilizing material, including biosolids, as not harmful to public health and safety.	X	X		
PRC §50002(b)	Establishes requirements for exemption of land application of biosolids that poses no threat to public health or the environment.	X	X	X	X
FAC §14505	Regulates municipal biosolids as a fertilizer.	X	X		
FAC §14560	Defines biosolids with respect to its use as a fertilizer.	X	X		
FAC §14682	Prohibits distribution of adulterated fertilizing materials including biosolids.	X	X		

Note: CCR = California Code of Regulations
PRC = Public Resource Code
FAC = Food and Agriculture Code
IN = Incineration
LA = Land Application
LC = Landfill Cover
SD = Surface Disposal

Presently, under the California Code of Regulations (CCR), Title 22, it is the waste discharger's responsibility to determine if the waste is classified as a hazardous waste pursuant to criteria established in CCR, Title 22, Division 4.5, Chapter 11, Article 3. If a waste were marginal, the DTSC would need to classify the waste.

In addition, the office of Environmental Health Hazard Assessment (OEHHA) has both a general and specific authority under the Health and Safety Code to protect public health. This includes the responsibility of regulating the utilization and disposal of biosolids via land application. While

the OEHHA's advisory guidelines and recommendations are not regulations, they often are used in an enforcement manner through incorporation into the RWQCB's Orders (Waste Discharge Requirements).

In response to concerns over the lack of State standards or guidelines regarding the land application of biosolids, the OEHHA's Sanitary Engineering Branch published a manual in April 1983 entitled "Manual of Good Practice for Landspreading of Sewage Sludge." The purpose of the manual was to set forth "those practices in the treatment and use of sewage biosolids which have been found effective in assuring the safe and beneficial use of the material."

State Regulations

On the State level, the SWRCB through its RWQCBs, regulates the landspreading of biosolids. The RWQCB currently follows EPA and DHS guidelines on land application of biosolids. Application of biosolids to land must not violate the water quality standards established for the respective Water Quality Control Basin Plans developed pursuant to Section 303(e) of the Clean Water Act. Therefore, each RWQCB may act independently in establishing permitting requirements for the land application of biosolids. Serano Regional Water Quality Control Boards have issued Waste Discharge Requirements (WDRS).

In June 1995, The Central Valley Regional Water Quality Control (CVRWQCB) Board adopted "General Order No. 95-140, Reuse of Biosolids and Septage on Agricultural, Forest, and Reclamation Sites", and "Resolution No. 95-144, "Waiving Waste Discharge Requirements for the Reuse of Exceptional Quality Wastewater Treatment Plant Biosolids as Fertilizer and Soil Amendment" (Appendix A and B, respectively). These new actions provided dischargers two additional permitting options beyond the standard individual Waste Discharge Requirements (WDRs).

In April 1996, General Order No. 95-140 and Resolution 95-144 were invalidated by the State Water Resources Control Board, by the adoption of Order 96-08. Projects previously permitted through the General Order were still allowed to operate; however, in 1997, Order 96-08 was amended with Order 97-07, which allows only those sites operating under waivers submitted before April 1, 1996 to continue to operate until the General Order complies with CEQA.

The discussion below provides the general intent and major technical parts of the General Order and the Waiver, including how they differ from the 503 regulations.

General Order. The General Order is intended to apply to the broadest number of situations in which biosolids would be land applied. No site-specific review is required by the Board under the General Order; therefore, several limitations are included that are more stringent than the 503 regulations. The General Order would streamline the regulatory process and make it quicker for discharges to obtain a land application permit. The General Order would not override any local prohibition against land application of biosolids. A summary of the major technical components of the General Order are:

Biosolids Material Covered:

1. Class A biosolids not meeting table 3 of 40 CFR503.13
2. Class B biosolids
3. Exception Quality (EQ) biosolids
   a. Mixture contain >50% biosolids applied at 10 dry ton per acre per year or greater on at least 20 acres.
   b. Mixture contain <50% biosolids applied at 20 dry ton per acre per year or greater on at least 20 acres.

Metals Standards:

1. The 503 ceiling limitations, high quality limitations, and cumulative loadings are the same except molybdenum has limits set. However, the General Order requires the lifetime tracking of cumulative loadings for metals in the biosolids, even when the "high quality" metals concentrations are met ("high quality" metals are exempt from tracking in 40 CFR Part 503).

2. Calculation methods are provided to allow the applicant to compare the metals concentrations with both EPA's "dry-weight" limits and Title 22's "wet-weight" limits.

Pathogens:

1. Both the Class A and Class B definitions are incorporated with no changes.

2. The "waiting periods" for public access, grazing, and crop harvest are the same; animals used in the production of unpasteurized milk are not allowed to graze on the land for 12 months after application of biosolids.

3. There must be at least a 24 inch depth to groundwater at the time of application (additional requirement beyond 503).

Vector Attraction Reduction Standards:

1. The 503 standards are incorporated with no changes.

Management Practices:

1. The Department of Fish and Game must be notified if biosolids will be placed on land which has not been disturbed for two or more years. A survey of listed plants and animals must be conducted, and written approval received from DF&G for avoidance, mitigation, or incidental take of the species.

2. Discharge of tailwater or field runoff within 30 days after application of Class A and B biosolids, septage is prohibited for application areas where biosolids have not been incorporated into the soil, or where there is not sufficient vegetation to prevent movement of biosolids particles from the site.

3. Land application at rates which exceed the agronomic rate of nitrogen uptake are prohibited. For reclamation sites, however, the rates can be exceeded with approval from the appropriate Regional Board administrator.

4. Setback distances for staging areas and application sites are as follows:

property lines	10 feet
domestic water supply wells *	500 feet
non-domestic water supply	100 feet
public roads	50 feet
surface waters	100 feet
agricultural buildings	10 feet
residential buildings	500 feet
domestic water supply reservoir	400 feet
primary tributary to a domestic water supply	200 feet
domestic surface water supply intake	2,000 feet

* A lesser setback distance from domestic supply wells (100 feet minimum) may be used if the Discharger can demonstrate that the groundwater, geologic, topographic and well construction conditions are adequate to protect the public health of users of the well water.

5. Discharge of Class A biosolids shall not cause or threaten to cause pollution as defined in the California Water Code.

6. Storage, transport, or application of biosolids shall not cause a nuisance as defined in the California Water Code.

7. Surface water runoff off the permitted site resulting from irrigation of sites to which biosolids has been applied is prohibited for 30 days after application of biosolids if vegetation in the application area and along the path of runoff does not provide 33 feet of unmowed grass or similar vegetation in the application area and along the path of runoff to prevent the movement of biosolids from the application site.

8. Any visible air-borne particulates leaving the application site during biosolids applications or during incorporation of biosolids at the permitted site is prohibited.

Storage Requirements:

1. Storage of biosolids on the ground is allowed for up to seven days at any one location within a 60 day period. The biosolids must not contain free liquids and runoff protection must be provided.

2. Flood and runoff controls are required in winter including covered storage between October 1 and April 30.

3. Storage facilities must be designed, maintained and operated to minimize leachate generation.

4. Public access must be controlled if the biosolids are Class B.

5. A storage plan must be approved by RWGCB officer if biosolids are to be stored at the site b beyond the time limits of the General Order.

6. Each biosolids' transport driver shall be trained as to the nature of their load and the proper response to accidents or spills events and carry a copy of an approved spill response plan.

Monitoring and Reporting:

1. There are three aspects to monitoring and reporting: pre-application reporting, semi-annual monitoring, and post-application reporting. Forms are provided with the General Order for the "Pre-Application Report" and the "Post-Application Report". Semi-annual monitoring of the biosolids is required for projects which continue for long periods of time.

Application Process:

Under the General Order, the individuals responsible for site operations retain primary responsibility for compliance with the requirements, including day-to-day operations and monitoring. Individual property owners and managers retain primary responsibility for crop selection, site restrictions, etc. The property owners have the ultimate responsibility for ensuring compliance. Under the General Order, the term "Discharger" refers to the owner/operator of the landspreading operation or facility.

1. The Discharger submits a "Notice of Intent" (NOI) and fee. The NOI describes who will be conducting the project and where the project is located. If correctly completed, submittal of the NOI grants coverage under the General Order without staff review or approval. The Regional Board has no discretion in accepting an NOI, other than to review it for completeness. The discharger must submit copies of the NOI to the Regional Board, Department of Fish and Game, and the County Health Department. A single NOI is limited to 2000 acres of land, within a 10 mile radius, and a single landowner.

2. The Discharger then submits a "Pre-Application Report" which describes how compliance with the General Order will be met (i.e. metals concentrations, loading rates, etc). The Regional Board must review and approve the "Pre-Application Report" prior to application of the biosolids.

3. Coverage under the General Order will cease upon submittal of a "Notice of Termination" and all required post-application reports.

Waiver Resolution

Waiver Resolution No. 95-144: The RWQCB adopted Resolution 95-144, waiving the waste discharge requirements for the beneficial reuse of biosolids that meet the 503 definition of "exceptional quality." The use of the biosolids must fully comply with all aspects of the 503 regulations, for bulk distribution or distribution in bags or containers. The biosolids must meet the 503.13 Table 3 criteria, Class A, and vector reduction requirements. Biosolids loading rates must not exceed the agronomic rates for the crop. The waiver places no restrictions on the acreage on which the biosolids are land applied, and no annual reports required.

The waiver can be issued to any qualifying dischargers and/or distributors of biosolids located within the Central Valley Region. The applicant must submit a one-page application form ("Request for Waiver of Waste Discharge Requirements for Beneficial Use of Exceptional Quality Biosolids") and pay the filing fee.

Local Requirements

Local enforcement agencies (LEA) may require use permits which regulate the implementation and operation of biosolids processing, handling, and beneficial use/disposal projects. Requirements vary from one jurisdiction to the next. Locally elected officials such as a board of supervisors may adopt ordinances which regulate biosolids projects. In other cases, local agencies such as the environmental health, planning, public works, or even sheriff's department may accept discretionary authority to regulate a project.

One issue that greatly impacts biosolids beneficial use/disposal sites in northern California is the passage of the Delta Protection Act in 1992. The Act declares the Sacramento-San Joaquin Delta as a natural resource of statewide, national and international significance, containing irreplaceable resources. As a result, the Delta Protection Commission adopted a ban which prohibits the location of new sewage treatment facilities and areas for disposal of sewage effluent and biosolids (including land application) within the Delta Primary Zone. The Delta Primary Zone includes portions of Contra Costa, Sacramento, San Joaquin, Solano, and Yolo Counties as shown. The Act was approved by members of the Delta Protection Commission.

Local counties generally require a conditional use permit that needs to be approved by the Regional Water Quality Control Board. Waste Discharge Requirements (WDRs) are issues by the regional Board. WDRs are then reviewed and subsequently approved by County agencies that have local ordinances. Several counties have recently enacted local ordinances. County ordinances typically fall under three categories: absolute ban, effective ban, and regulated use. The regulated use ordinances are typically more restrictive than state or federal requirements. An

effective ban ordinance is written in a way as to "effectively" ban the land application of biosolids. The following table lists the counties and what ordinance category that they fall under.

Table 9 - County Biosolids Ordinance Categories

Absolute Ban	Effective Ban	Regulated Use
Sutter	Monterey	Solano
San Joaquin	San Benito	Merced
Stanislaus	Yuba	Yolo
	Glenn	Kern
	Imperial	Riverside
	San Luis Obispo	Tulare
	San Bernadino	

Counties not listed above do not have any specific regulations and follow the RWQCB requirements.

County Ordinance Description

The following is a summary of county ordinances and how they differ from the proposed GO and 40CFR503 requirements.

Riverside county

A sludge management plan needs to be developed and approved by the County Environmental Health Officer. Biosolids transportation requirements include: vehicle maintenance and repair documentation, vehicle identification. Buffer zones include a minimum 50 feet distance between adjacent property lines and biosolids land application. Other requirements will be established by resolution adopted by the Board of Supervisors.

San Bernadino County

Minimum separation distances include a 1/2 mile between biosolids land application and 1. Operating dairy with lactating cattle, 2. Any public water supply well, 3. Any live stream, lake or surface impoundment.

Tulare County

Application of all class B biosolids is prohibited. Biosolids shall not be applied to land where surface to groundwater level. Wind speeds in excess of 20 miles per hour also prevent the land application of biosolids. Biosolids land application is prohibited where depth to groundwater is less than ten feet. A land spreading plan is also required. Annual monitoring includes testing for Dioxins, Furans, PCBs, and miscellaneous organic pollutants (Chlorinated Pesticides, PCBs, and Base/Neutral Extractable Organics).

Yolo County

Biosolids shall not be applied to any land between November 15 to April 15, and in the delta primary zone at any time. Wind speeds in excess of 5 miles per hour also prevents the land application of biosolids. Biosolids shall not be applied on "highly erodible" land as classified by USDA Natural Resources Conservation Service (NRCS). Biosolids shall not be applied to soils where depth to groundwater is less than five feet. Biannual monitoring includes testing for Chlorinated Pesticides, PCBs, and Base/Neutral Extractable Organics.

Kern County

The Kern County ordinance is currently being developed. The requirements have not yet been adopted by the County. Some of the interim requirements include: Depth to groundwater must be at least 20 feet unless shallow groundwater TDS levels exceed 3,000 mg/l and this groundwater cannot be reasonably expected to supply groundwater. Biosolids must be incorporated into the soil at least seven inches within 24 hours of application. Biosolids monitoring is required as frequently as once per month depending on the land application rate and area.

Merced County

For slopes greater than 2%, parallel disking to slope contours is required for biosolids incorporated into the soil. Biosolids shall not be applied to soils where depth to groundwater is less than five feet. Biosolids land application is limited to once per crop. Annual monitoring includes testing for Dioxins, Furans, PCBs, and miscellaneous organic pollutants (Chlorinated Pesticides, PCBs, and Base/Neutral Extractable Organics).

Yolo County

Biosolids shall not be applied to any land between November 15 to April 15, and in the delta primary zone at any time. Wind speeds in excess of 5 miles per hour also prevents the land application of biosolids. Biosolids shall not be applied on "highly erodible" land as classified by USDA Natural Resources Conservation Service (NRCS). Biosolids shall not be applied to soils where depth to groundwater is less than five feet. Biannual monitoring includes testing for Chlorinated Pesticides, PCBs, and Base/Neutral Extractable Organics.

Solano County

Neighboring residents can file a protest which can effectively stop biosolids application. Biosolids shall not be applied to soils where depth to groundwater is less than five feet. Biosolids shall not be applied to any land between November 15 to April 15, and in the delta primary zone at any time.